



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

## NOTES FOR STUDENTS.

THE MUCH-STUDIED glandular hairs of *Dipsacus sylvestris* have been again examined by Rostock,<sup>12</sup> who finds no absorption of food materials, as F. Darwin suggested, and no absorption of the water itself, which is purely a protection to the leaves against snails and caterpillars.—C. R. B.

A SOMEWHAT EXHAUSTIVE STUDY of *Fegatella conica*, by F. Cavers<sup>13</sup> seems to indicate that in large measure it repeats the well-known history of Marchantia. Contrasting features are the simple air pores, the more differentiated thallus, the "mycorrhizal zone," the larger sperms, and the fact that the cover-cell of the archegonium does not contribute to its elongation (which may be true also of Marchantia).—J. M. C.

RICHARDS AND MACDOUGAL<sup>14</sup> find that when the nitrogen of the air is replaced by CO or by illuminating gas, which contains *ca.* 40 per cent. of CO, seed plants of various kinds show toxic effects, growth, irritability, and chlorophyll formation being notably retarded or inhibited. Mosses were less affected, some enduring CO or "gas" for three months, with injury only to older leaves. In "gas" there are evidently present other toxic agents than CO.—C. R. B.

TONDERA finds<sup>15</sup> in the young internodes of the Cucurbitaceae the "starch-sheath" supplied with fine-grained starch, equally distributed through the protoplasm; whereas only in the older internodes which are not geotropic are there coarse grains that lie on the lower side of the cell. This, he argues, militates against the statolith theory of geotropism. He thinks the "starch-sheath" a storage region during the formation of the zone of mechanical tissue (stereome or collenchyma) which adjoins it.—C. R. B.

RAUNKIÆR<sup>16</sup> has arranged the species of Potamogeton into groups based mainly upon anatomical characters, such as the build of the central cylinder, presence or absence of cortical strands, nature of the endodermis. The author considers that anatomical distinctions are more satisfactory than any others in recognizing the different species. He claims to settle on anatomical grounds the vexed question as to what constitutes *P. fluitans* Roth, and concludes that two quite different plants have been included under this name.—M. A. CHRYSLER.

<sup>12</sup> ROSTOCK, R., Ueber die biologische Bedeutung der Drüsenhaare von *Dipsacus sylvestris*. Bot. Zeitung 62<sup>1</sup>: 11-20. 1904.

<sup>13</sup> CAVERS, F., On the structure and biology of *Fegatella conica*. Ann. Botany 18: 87-120. pls. 6-7. 1904.

<sup>14</sup> RICHARDS, H. M., and MACDOUGAL, D. T., The influence of carbon monoxid and other gases upon plants. Bull. Torr. Bot. Club 31: 57-66. 1904.

<sup>15</sup> TONDERA, F., Contribution à la connaissance de la gaine d'amidon. Bull. Acad. Sci. Cracovie, Math. Nat. Cl. 1903: 512-516. pl. 1.

<sup>16</sup> RAUNKIÆR, C., Anatomical Potamogeton-studies and *Potamogeton fluitans*. Botanisk Tidsskrift 25: 253-280. 1903.

W. C. WORSDELL<sup>17</sup> has published a valuable historical sketch of the views that have been held as to the nature of the ovule. It is a great convenience to have the extensive literature of the subject digested and available in compact form. The views of the numerous contributors to the literature of the subject are put under three categories: (1) axial theory; (2) foliar theory; and (3) *sui generis* theory, which means that the ovule is to be regarded as an independent structure, borne either on stem or foliar organs. The bibliography contains 149 titles under 82 authors.—J. M. C.

KARSTEN AND SCHENCK have issued three more numbers of their valuable *Vegetationsbilder*.<sup>18</sup> The sixth number was prepared by Karsten and portrays the following tree monocotyledons: Pandanus, Zanthorrea, Yucca, Nolina, Dendrocalamus, Ravenala. In the seventh number Schenck illustrates the strand vegetation of Brazil, giving several photographs of the Pes-Caprae and Restinga formations. Karsten and Stahl prepared the eighth number, which treats of Mexican xerophytes. Excellent illustrations of cacti, agaves, and other desert forms are brought together. These numbers maintain the high standard of the earlier parts, and it is more apparent than ever that this publication is of great practical value to all botanical libraries and laboratories.—H. C. COWLES.

ERWIN F. SMITH AND DEANE B. SWINGLE<sup>19</sup> have published the results of their study of the dry rot of potatoes. The "bundle blackening" and "dry end-rot" are found to be two stages of the same disease, which begins in the field in the underground stems and roots. A fungus, which has proved to be a *Fusarium*, is always present in the darkened vascular bundles of the tubers. The fungus tolerates large amounts of certain acids, as malic, citric, and tartaric, and is inhibited by small amounts of others, as formic, acetic, and butyric. It attacks the plants from the soil and winters over in the earth, so that in land frequently planted to potatoes it can probably maintain itself indefinitely. Infected land should be planted to other crops for a series of years, and great care should be taken to avoid the infection of healthy land by planting diseased tubers.—J. M. C.

MOLISCH, seeking to check Friedel's and Macchiati's results, which indicate that photosynthesis is an enzymatic process,<sup>20</sup> reports experiments upon several plants, using the luminosity of *Micrococcus phosphoreus* as a reaction for the evolution of oxygen (Beijerinck's method, the sensitiveness of which

<sup>17</sup> WORSDELL, W. G., The structure and morphology of the "ovule." *Ann. Botany* 18: 57-86. 1904.

<sup>18</sup> KARSTEN, G., and SCHENCK, H., *Vegetationsbilder*. Hefte 6, 7, 8. *pls.* 31-48. Jena: Gustav Fischer. 1903. Single parts *M* 4; to subscribers *M* 2.50.

<sup>19</sup> SMITH, ERWIN F., and SWINGLE, DEANE B., The dry rot of potato due to *Fusarium oxysporum*. U. S. Dept. Agric., Bur. Pl. Industry, Bull. 55. pp. 64. *pls.* 8. Issued Feb. 16, 1904.

<sup>20</sup> Reviewed in *BOT. GAZ.* 32:430. 1901; 33:315. 1902; 35:226. 1903.

he tested and confirmed).<sup>21</sup> Green sap, obtained by rubbing up fresh leaves in a mortar or by compression and filtering through paper, can set free oxygen. Leaves of *Lamium album* dried at room temperatures or in an oven at 35° C., so that they felt quite dry and had completely lost their vitality, were rubbed up with water and yielded a sap of like powers. But this, as shown by microscopic observation, was dependent upon the plasma particles and chloroplasts which pass through filter paper; for the same sap after filtration through a Berkefeld or Chamberland tube, whether from living or dead leaves, had no such reducing power. Molisch also attempted to repeat Friedel's and Macchiati's experiments, but unsuccessfully. His results with *Lamium*, however, incline him to think that it may yet be possible to study photosynthesis apart from the living cell.—C. R. B.

THE SUBJECT which Professor Seward<sup>22</sup> treats in a general way in his presidential address at the Southport meeting of the British Association is one of commanding importance to all students of plant evolution and geographical distribution, and yet it is a branch of the science much neglected by the students of modern groups. Professor Seward divides the world into twenty-two entirely arbitrary regions, and discusses briefly the rise and fall of the various botanical types that have moved across the stage from the pre-Devonian to the present time. It would seem to the writer that the differences between the northern and southern floras in the Carboniferous are emphasized somewhat more strongly than the evidence warrants, and that Professor Seward unduly depreciates paleobotanical evidence other than what is based on anatomical studies of tissues and fructifications. While it is unfortunately true that the latter Mesozoic formations furnish us with almost nothing but carbonaceous impressions, and while we might wish it otherwise, still we cannot afford to ignore what facts we have of the days when the angiosperms were rapidly assuming the leading rôle in the vegetation of the world. The whole address is a most able and earnest plea for a sympathetic study of ancient floras and for a wider viewpoint among specialists in that field of botanical activity. It is eminently desirable that it should receive more attention from American botanists than it is likely to attract.—EDWARD W. BERRY.

PALEOBOTANICAL NOTES. — KATZER,<sup>23</sup> in a short paper on the geological development of the *Braunkohlenschichte* of the Zenicer depression in Bosnia, enumerates fourteen well-known species of Miocene plants. This

<sup>21</sup> MOLISCH, H., Ueber Kohlensäure-Versuche mittelst der Leuchtbakterien-methode. Bot. Zeitung 62<sup>1</sup>: 1-10. 1904.

<sup>22</sup> SEWARD, A. C., Floras of the past: their composition and distribution, British Assn. Adv. Sci. Southport. 1903.

<sup>23</sup> KATZER, F., Geološki razvoj naslage mrkog nglja n zeničkoj kotlini. (Geol. Entwicklung der Braunkohlenschichte der Zenicker Depression) Glasnik gemalj. muz. n Bosni i Hercegov. 15: 101. 1903.

paper is followed by a more lengthy paper by Engelhardt,<sup>24</sup> who enumerates sixty-two species of plants from this region in Bosnia in beds of the Miocene age. Two species of *Tilia* from Doboj and Kakanj are described as new. The flora shows a considerable mixture of northern and southern forms, and includes twenty-six species common to the American Tertiary.—KIDSON<sup>25</sup> has described the Carboniferous plant remains from the border region of Canonbie and Dumfriesshire, Scotland, and parts of Cumberland and Northumberland, England. They include remains from both the lower barren measures and from the upper measures, some of the horizons of the latter not before known in this region. A new genus, *Eskdalia*, is proposed for the reception of certain fern stems, and a number of new species in other genera are described.—ARBER and NEWELL<sup>26</sup> have a paper on homoeomorphy among fossil plants illustrating that well-known tendency exhibited in some groups of unallied forms to show an aggregate of common characters. While the term is not exactly synonymous with what has been called convergence, it seems to be the same as the term "homoplasmy" as used by the zoölogists Lankester and Osborn, or the "homomorphy" of Fürbringer. POOLE<sup>27</sup> contributes a short paper on a remarkably well-preserved section of *Stigmaria* from the coal measures of Stellarton. The scalariform tissue of the medulla is particularly well shown. There are over thirty vascular bundles, each containing from five to fifteen radial rows of rectangular cells, with about forty cells in each row.—Contributions of minor importance are an anatomical paper by STOPES<sup>28</sup> on the epidermoidal layer of calamite roots; a paper on *Xenophyton radiculosum* and on a stigmarian rootlet probably related to *Lepidophloiois fuliginosus*, by WEISS;<sup>29</sup> a paper by KERNER<sup>30</sup> describing a new locality for Tertiary plants in Dalmatia; a paper by KIDSON<sup>31</sup> entitled Notes on some Scottish floras of Lower Carboniferous age; and a paper by STERZEL<sup>32</sup> on the character of the floras of the Carboniferous and Permian from the well-known locality of Zwickau in Saxony.—EDWARD W. BERRY.

<sup>24</sup>ENGELHARDT, H., Prilog poznavanjn fosilne flore is naslage smegjeg ngljena n kotlini Zenica-Sarajevo n Bosni. ( Beitr. z. Kennt. der foss. Fl. aus der Braunkohlenschichte im Sarajevo, Zenicer, Kassel in Bosnien) *Ibid.* 15: 115-136. 1903.

<sup>25</sup>KIDSON, R., The fossil plants of the Carboniferous rocks of Canonbie, etc. Trans. Roy. Soc. Edinburgh 40: 741-833. *pl.* 1-5 and *fig. in text.* 1903.

<sup>26</sup>ARBER and NEWELL, Geol. Mag. N. S. 10: 388-395. Sept. 1903.

<sup>27</sup>POOLE, H. S., Proc. & Trans. Nova Scotia Inst. Sci. 10<sup>3</sup>: 345-347. *pl.* 2. Oct. 1902.

<sup>28</sup>STOPES, M. C., Ann. Botany 792-794. 1903.

<sup>29</sup>WEISS, F. E., Mem. & Proc. Manch. Lit. & Philos. Soc. 46: pt. 3. 1902.

<sup>30</sup>KERNER, F., Verh. k.k. Reichsanstalt 1903: 342-344.

<sup>31</sup>KIDSON, R., Summary of Prog. Geol. Surv. United Kingdom for 1903. pp. 130-137.

<sup>32</sup>STERZEL, T., Erl. geol. Spezialkarte Königr. Sachsen. 2 Aufl. Leipzig 1901. pp. 85-139.

VERNON H. BLACKMAN<sup>33</sup> has published a preliminary notice of the results of his study of the Uredineae, the full paper, with figures, to appear later in the *Annals of Botany*. The forms studied were *Phragmidium violaceum* Wint. and *Gymnosporangium clavariaeforme* Rees. Sapin-Trouffy's cycle of nuclear development was confirmed, which is as follows: the mature teleutospore is uninucleate and this condition persists through sporidia and the aecidial mycelium; in the young aecidium the nuclei become paired, and this condition persists through aecidiospores, the ensuing mycelium, the uredospores, and into the young teleutospores; in the maturing teleutospores the two nuclei fuse. It was this fusion in the teleutospore that Sapin-Trouffy regarded as fertilization.

Blackman concludes that the spermatia are male cells that have become functionless, basing his conclusions upon the cytological characters, which are clearly those of male cells and not of conidia. The aecidium of *P. violaceum* arises as a layer of rectangular uninucleate cells just beneath the epidermis of the leaf. Each of these cells becomes divided into a short sterile cell above, which soon degenerates, and a fertile cell below, which becomes binucleate and gives origin to a row of binucleate aecidiospore mother-cells. Thus the condition of paired nuclei starts in the fertile cell and is continued to the teleutospore. The fertile cell, which the author regards as a female cell, does not become binucleate by division of its original single nucleus, but by the migration through the walls of the nucleus of a neighboring vegetative cell. This association of the two nuclei he regards as representing fertilization, rather than the act of fusion in the teleutospore.

This means a sharply marked alternation of generations among the Uredineae. The gametophyte starts with the uninucleate teleutospore, the production of the four sporidia representing a tetrad division; from these the mycelium of the gametophyte develops and produces later the spermogonia and aecidia. The fertilized cell in the aecidium starts the sporophyte generation with paired nuclei, from which the aecidiospores almost immediately arise; the sporophyte mycelium bears later uredospores and finally teleutospores. The fusion of nuclei in the teleutospore cannot then be looked upon as a process of fertilization, but merely as the secondary process which brings about the disappearance of the special cytological conditions initiated by fertilization, *i. e.*, change from the sporophytic to the gametophytic condition; it must accordingly be looked upon as a reduction process. Like the reduction process in higher plants, it is followed by a tetrad division. These conclusions apply also to the fusion of nuclei in the basidium, as Maire has shown that Basidiomycetes also have paired nuclei that fuse in the basidium.

Just how the fusion of sexual and vegetative nuclei is to be regarded as fertilization is not clear, but such cases loosen up the previous rigidity of

<sup>33</sup> BLACKMAN, VERNON H., On the fertilization, alternation of generations, and general cytology of the Uredineae. Preliminary notice. *New Phytologist* 3: 23-27. 1904.

ideas concerning fertilization. Farmer's phrase "apogamous fertilization" is a proper expression of uncertainty in reference to the definite criteria of fertilization.—J. M. C.

TWO PAPERS by Fitting constitute a very valuable contribution to our knowledge of the physiology of tendrils. The earlier paper<sup>34</sup> is a quantitative study of the growth of stimulated and unstimulated tendrils. Special attention is given to curvatures resulting from contact stimulus, but those resulting from amputation, temperature variation, and mechanical bending are also considered.

The growth of unstimulated tendrils is intercalary, being most intense in the basal half and manifesting two distinct phases of acceleration separated by a period of diminished rate. Growth is uniformly distributed in the tendrils in the first of these two phases, but in the second curvature appears as a consequence of unequally distributed growth, which is maximum at the periphery of the side becoming convex and gradually diminishes to zero at the periphery of the concave side.

Especially notable is the author's discovery of high perception capacity associated with low reaction capacity. It has long been known that some tendrils react to stimuli applied on any side and others only when stimulated on one side. The latter are, however, sensitive on all sides, even though unable to respond to stimuli not ventrally applied. This is shown when a stimulus dorsally applied inhibits response to one ventrally applied. In such tendrils a dorsal stimulus will even inhibit the completion of a curve already commenced in response to a ventral stimulus.

The stimulation of opposite sides does not appreciably affect growth in either uniformly reacting or locally reacting tendrils. The curvature formed in response to contact stimulus is after a period of hesitation followed by a reverse curve which accomplishes straightening and is regarded by Fitting as autotropic. The mechanism is the same in each of these curves, the growth of the middle zone being accelerated. This eliminates turgor variation as a factor in curvature, especially since the growth of the concave side is not actually retarded.

The correction of artificial bendings mechanically formed coincides in process with formation of curves in response to contact stimulus. Haptrotropic curvatures are distinguishable from other tropic curves by the manifest acceleration in growth of middle zone. The encircling of a support is accomplished by curves formed in response to a series of contact stimuli. Prolonged contact is not a stimulus to effect an acceleration of growth. Exception is taken to Noll's "Reizfelder" hypothesis.

The later paper<sup>35</sup> is a further study of the curves produced in tendrils as

<sup>34</sup> FITTING, HANS, Untersuchungen über den Haptotropismus der Ranken. *Jahrb. Wiss. Bot.* 38: 545-634. 1903.

<sup>35</sup> FITTING, H., Weitere Untersuchungen zur Physiologie der Ranken. *Ibid.* 39: 424-526. 1903.

a result of decapitation and amputation, together with a consideration of the physiology of stimulus transmission in tendrils and in *Mimosa*.

When tendrils of *Passiflora* sp. are severed at the base, a strong apical curvature appears in one or two minutes. This curvature is limited to the haptrotropically sensitive zone and becomes corrected if the tendril has its cut surface in water. Both curvature and recurvature are true growth phenomena, being dependent upon an accelerated growth of the middle zone. Similar responses may be obtained with tendrils belonging to widely different families, although minor modifications appear. In some tendrils a fluid drop exudes from the exposed surface, and in others no such drop appears. The incision must enter the central cylinder in order to produce a curve. Piercing with a fine needle is a stimulus if the central cylinder is penetrated. The impulse travels from the locus of amputation toward the motor zone very rapidly, even as fast as  $20^{\text{mm}}$  per second, and the actual rate is probably greater because the larger portion of time elapsing between stimulation and response is to be considered as a latent period.

From old and new experiments it is evident that the process of transmitting a wound stimulus in *Mimosa* coincides in all essential particulars with such a process in tendrils. All indications are that in *Mimosa* transmission occurs in the living cells. Since in some cases an impulse is carried beyond a deadened zone it seems improbable that the plasma actively participates in the transmission. Haberlandt's theory of a diminution of hydrostatic pressure in the conductive tissue as an explanation of the transmission process is inadequate because it occurs in plants which are without *Schlauchzellen*.—  
RAYMOND H. POND.